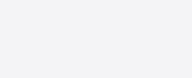


Scientific Research On Wireless Health Effects



Peer Reviewed Scientific Research On Wireless Radiation

Published Research Links Cell Phone and Wireless To Health Effects

Cell phones and wireless expose people to a type of microwave radiation also known as radiofrequency radiation or RF-EMF. Peer reviewed research has demonstrated a myriad of adverse biological effects from wireless radiation including reproductive dysfunction, single- and double-stranded DNA breaks, creation of reactive oxygen species, immune dysfunction, stress protein synthesis in the brain, altered brain development, sleep and memory disturbances, and increased brain tumors.

"Waiting for high levels of scientific and clinical proof before taking action to prevent well-known risks can lead to very high health and economic costs, as was the case with asbestos, leaded petrol and tobacco." —The European Commission

These effects have occurred at wireless radiation exposure levels hundreds of times lower than presently legal international limits. These effects have occurred after exposure to devices that are government approved and legally sold to the public.

5G

More than 240 scientists [published](#) an appeal to the United Nations to reduce public exposure and are calling for a [moratorium on 5G](#) citing "established" adverse biological effects of RF radiation. Scientific data on the biological effects of radiofrequency indicate the immediate need for a cautionary approach to protect the public. The research has accumulated enough to provide strong evidence that even *low levels are not safe*.

Below we have a short summary of the science and links to published research. Click on the drop down tab to see a list of scientific references. These are only a small example of the thousands of studies.

We also recommend these research compilations:

[The Bioinitiative Report 2012](#)

[Annotated Bibliography of Scientific Papers](#) by Joel M. Moskowitz, Ph.D. School of Public Health University of California, Berkeley.

[PowerWatch: 1,670 Peer-Reviewed Scientific Papers on Electromagnetic Fields](#)

["5G: Great risk for EU, U.S. and International Health! Compelling Evidence for Eight Distinct Types of Great Harm Caused by Electromagnetic Field \(EMF\) Exposures and the Mechanism that Causes Them"](#) by Dr. Martin Pall

Scientific Evidence Documenting Increased Cancer From Exposure

The research evidence indicates that long term use of cell phones and wireless increase the risk of cancer risk. Independent longitudinal research has consistently shown that "heavy" (30 min/day) cellphone users have an increased risk of brain cancer. Such research lead to the World Health Organization's International Agency for the Research on Cancer to classify this radiation as a Class 2 B Possible Human Carcinogen in 2011. Since 2011, the evidence has increased.

"A disservice has been done in inaccurately depicting the body of science, which actually indicates that there are biological effects from the radiation emitted by wireless devices, including damage to DNA, and evidence for increased risk of cancer and other substantial health consequences...The public the world over has been misled by this reporting." — Dr. Ronald B. Herberman

Dr. Hardell's [research](#) showed that adults who started using cell or cordless phones as teenagers had an 8-fold higher risk of brain cancer on the side of their head where they held the phone. A French [study](#) also found increased brain cancer in long term cell phone users. To date, the only published study of children's risk of brain cancer from cell phone use found more than a 2-fold risk after >2.8 years of use (from billing records), combined with a statistically significant trend of increasing risk with increasing years of use.

In 2015 Lerchl et al published an important replication study which confirms that wireless acts as a tumor promoter. In this important study, lymphomas and tumors of the lungs and livers in exposed animals were significantly higher. The wireless exposure was at low to moderate exposure levels well below exposure limits for the users of mobile phones. This research is significant in that it used a larger group of mice and replicated tumor-promoting effects shown in a 2010 study ([Lerchl 2015](#)).

A 2019 literature review ["Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation"](#) found that 93 of the 100 peer-reviewed studies dealing with oxidative effects of low-intensity RFR, confirmed that RFR induces oxidative effects in biological systems.

["Planetary Electromagnetic Pollution: It Is Time to Assess Its Impact"](#) published in The Lancet documents the significant increase in environmental levels of radio-frequency (RF) electromagnetic wireless radiation over the last two decades. The study cites an evaluation that found 68.2% of 2266 studies in humans, animals, and plants demonstrated significant biological or health effects associated with exposure to electromagnetic fields. 89% of experimental studies that investigated oxidative stress endpoints showed significant effects and "radiofrequency electromagnetic radiation causes DNA damage apparently through oxidative stress. The paper also highlights research that has associated RF exposure with altered neurodevelopment and behavioural disorders, structural and functional changes in the brain and the sensitivity of pollinators. "These findings deserve urgent attention. This weight of scientific evidence refutes the prominent claim that the deployment of wireless technologies poses no health risks at the currently permitted non-thermal radiofrequency exposure levels." ([Bandara and Carpenter 2018](#))

The review ["Thermal and non-thermal health effects of low intensity non-ionizing radiation: An international perspective"](#) published by researchers of the European Cancer Environment Research Institute in Brussels, Belgium and the Institute for Health and the Environment, University at Albany, NY, USA reviews current research findings and states that, "the mechanism(s) responsible include induction of reactive oxygen species, gene expression alteration and DNA damage through both epigenetic and genetic processes." The paper states that "exposure to low frequency and radiofrequency electromagnetic fields at low intensities poses a significant health hazard that has not been adequately addressed by national and international organizations such as the World Health Organization."

[+ Read the research showing increased cancer risk here.](#)

Fertility and Reproduction

Consistent evidence from experimental research, epidemiological studies, in vitro (cells) laboratory studies, and in vivo (animal) studies shows that RF exposure is associated with reduced sperm count, motility and concentration, as well as DNA damage and altered cell structure. Research also shows damage after wireless exposure to the ovaries of rats and mice, as well as changes in the eggs of flies and birds.

[+ Read the scientific research showing damage to the reproductive system by clicking here](#)

Neurotoxic Effects

Experimental research shows chronic exposure to wireless reduces brain cells and causes brain cell death in the memory and learning centers of the brain. Cell phone radiation has also been shown to alter brain activity in humans. In 2011, [NIH research](#) found just 50 minutes of a wireless transmitting device (cell phone) next to the brain increases glucose in the part of the brain most exposed. Preliminary [3G](#) and [4G](#) research has further shown that non-thermal levels of this radiation alter the brain's electrical activity.

[+ Click here to read the research showing damage to the brain.](#)

Cognition and Impaired Memory

Yale University research found prenatally exposed pups had impaired memory, increased hyperactivity, and altered brains—consistent with a growing literature. Many studies have now demonstrated that wireless signals can damage cognitive abilities such as learning, memory, attention, and reaction times.

"We have shown that behavioral problems in mice that resemble ADHD are caused by cell phone exposure in the womb," said Dr. Hugh Taylor of Yale Medical School. "The rise in behavioral disorders in human children may be in part due to fetal cellular telephone irradiation exposure."

[+ Click here for research showing impacts to cognition, learning and memory](#)

Behavioral Issues

Epidemiological studies have shown associations between exposures and behavioral issues in children (and experimental test subjects). For example, a [recent study](#) showed a significant dose-response relationship between the number and duration of voice calls made on cell phones and ADHD risk among children who were also exposed to lead in their environment. Exposure to cell phones prenatally and postnatally is associated with behavioral difficulties such as emotional and hyperactivity problems.

[+ Click here to read research on behavioral issues.](#)

Hearing Loss

Research in humans shows that chronic mobile phone usage results in high-frequency hearing loss and inner ear damage. Research has also shown a significant risk of tumors on the auditory nerve in the brain (acoustic neuromas). Experimental research with rodents shows signs of neuronal degeneration in the auditory system after exposure.

[+ Read the research showing wireless damage to hearing and the auditory system by clicking here.](#)

Headaches

Research shows children who used cell phones or who were exposed prenatally to wireless radiation are at higher risk of developing headaches.

[+ Read the research on wireless and headaches by clicking here.](#)

Sleep

The radiation from wireless transmitting devices damages sleep. For example, this radiation has been shown to [delay entrance](#) into deep non-REM sleep and decrease time spent in this stage of sleep. The quantity and quality of sleep has a profound impact on learning and memory. A sleep-deprived person cannot focus or learn efficiently. Sleep also has a critical role in the consolidation of memory essential for learning new information.

[+ Click here to read research on wireless radiation and sleep.](#)

Oxidative Stress

Oxidative stress is the formation of tissue-damaging free radicals. A recent research review shows **93 out of 100** currently available peer-reviewed studies indicate that radiofrequency radiation increases oxidative stress. This stress response damages cells and DNA through the production of peroxides and free radicals. Oxidative stress is implicated in the cause of many diseases such as cancer and Alzheimer's disease.

[+ Click here to read research showing increased oxidative stress.](#)

Genotoxic Effects

Radiation at extremely low levels (0.0001 the level emitted by the average digital cellular telephone) caused heart attacks and the deaths of some chicken embryos...independent, third-party peer-reviewed studies need to be conducted in the U.S. to begin examining the effects from radiation on migratory birds and other trust species. —Willie Taylor, US Department of the Interior in his February 2014 letter to Mr. Eli Veenendaal of the National Telecommunications and Information Administration, U.S. Dept. of Commerce.

Studies at non-thermal (no measurable temperature change) levels of microwave exposures show chromosomal instability, altered gene expression, gene mutations, DNA fragmentation, and DNA structural breaks. Genetic mutations and cellular damage can potentially contribute to cancer growth. Strong effects from microwaves have been found in stem cells. Since stem cells are more active in children, researchers are concerned that children are at increased risk.

While electromagnetic fields may not directly damage DNA, research indicates they could set into motion a series of biological impacts that result in genetic damage.

A 2015 [experimental study](#) found that 2.4 GHz (Wi-Fi radiation) can alter expression of some of the miRNAs, and the study's authors concluded that "long-term exposure of 2.4 GHz RF may lead to adverse effects such as neurodegenerative diseases originated from the alteration of some miRNA expression and more studies should be devoted to the effects of RF radiation on miRNA expression levels."

Dr. Lai [analyzed research](#) since 2006 and found there are more papers reporting effects from exposure than no effect. New radiofrequency studies report that 65% of genetic studies show effects and 35% do not show effects.

[+ Read more about research on genotoxic effects here.](#)

Endocrine System Damage

Research has shown impacts to the pineal gland, adrenal gland, and thyroid gland. These glands balance hormones that involve sleep. Research has shown that low levels of microwave exposure can reduce melatonin. Melatonin is not just critical to maintaining our sleep rhythm but it is also an extremely important antioxidant that helps to repair damaged DNA and reduces the growth of cancer cells. Additionally, research shows thyroid hormone levels can be impacted by wireless radiation. It has been established that even a small change in thyroid hormones can alter the brain.

[+ Read more about research on Endocrine System damage here.](#)

Disruptions to Heart Functioning

Research shows increases in heart rate, arrhythmias, dizziness, changes in blood pressure, and other disturbances in the heart's cardiovascular functioning after exposure to wireless radiation. Several studies reported changes in EEG after prolonged repeated exposure to radiofrequency radiation. In some of these studies, relatively low power densities were used.

[+ Click here to read some research on heart function.](#)

A Synergistic Effect between Electromagnetic Fields and Toxic Exposures

Research shows that exposure to electromagnetic fields could potentially increase the effects from other exposures. For example, a recent [study](#) showed a significant dose-response relationship between the number and duration of voice calls made on cell phones and ADHD risk among children exposed to lead in their environment.

[+ Click here to read research on Electromagnetic Fields and Toxic Exposures](#)

Reviews of the Research

There have been many notable research reviews published that cover various research topics in electromagnetic fields.

[+ Click here to review several key research reviews.](#)

Exposure Assessment

The number of mobile phones, laptop computers, and other devices emitting radio frequency radiation to which we are exposed on a daily basis is enormous. Wi-Fi and cell phones are ubiquitous. Current research indicates that children and the fetus are most at risk from exposures to electromagnetic fields. Their systems are still developing so even small results can result in large impacts later in life. Equally important, their smaller stature, thinner skulls and unique body makeup result in radiofrequency radiation penetrating their brains and bodies more deeply in proportion to adults. Children have more active stem cells which are shown to be more impacted by microwave radiation. Current government safety standards do not adequately account for these differences.

[+ Click here to read current research on exposure assessment and how children and the fetus are uniquely vulnerable due to their unique anatomy.](#)

This is but a small sampling of the research. In addition to the research found here, EHT advisors have a significant amount of peer reviewed published research. Please visit our page listing these studies by clicking here.

5G

["5G Wireless Expansion: Public Health and Environmental Implications"](#) is a research review that documents the range of reported adverse effects of RF and millimeter waves—effects range from cancer to bacteria growth changes to DNA damage. The study concludes that "a moratorium on the deployment of 5G is warranted" and "the addition of this added high frequency 5G radiation to an already complex mix of lower frequencies, will contribute to a negative public health outcome ... from both physical and mental health perspectives" ([Russell 2018](#)).

["Towards 5G communication systems: Are there health implications?"](#) is a research review detailing research findings that millimeter waves can alter gene expression, promote cellular proliferation and synthesis of proteins linked with oxidative stress, inflammatory and metabolic processes." The researchers conclude, "available findings seem sufficient to demonstrate the existence of biomedical effects, to invoke the precautionary principle" ([Di Ciaula 2018](#)).

["Systematic Derivation of Safety Limits for Time-Varying 5G Radiofrequency Exposure Based on Analytical Models and Thermal Dose"](#) documents how significant tissue heating can be generated by 5G technology's rapid short bursts of energy. "The results also show that the peak-to-average ratio of 1,000 tolerated by the International Council on Non-Ionizing Radiation Protection guidelines may lead to permanent tissue damage after even short exposures, highlighting the importance of revisiting existing exposure guidelines." (Neufeld and Kuster 2018)

["The Human Skin as a Sub-THz Receiver – Does 5G Pose a Danger to It or Not?"](#) and ["The Modeling of the Absorbance of Sub-THz Radiation in Human Skin"](#) are two papers by physicists presenting research that found higher 5G frequencies are intensely absorbed into human sweat ducts (in skin), at much higher absorption levels than other parts of our skin's tissues ([Betzalel 2017](#), [Betzalel 2018](#)). The researchers [conclude](#), "we are raising a warning flag against the unrestricted use of sub-THz technologies for communication, before the possible consequences for public health are explored."

["Exposure of Insects to Radio-Frequency Electromagnetic Fields from 2 to 120 GHz"](#) published in Scientific Reports is the first study to investigate how insects (including the Western honeybee) absorb the higher frequencies (2 GHz to 120 GHz) to be used in the 4G/5G rollout. The scientific simulations showed increases in absorbed power between 3% to 370% when the insects were exposed to the frequencies. Researchers concluded, "This could lead to changes in insect behaviour, physiology, and morphology over time..." ([Thielsens 2018](#))

[Click here to read more research on 5G](#)

